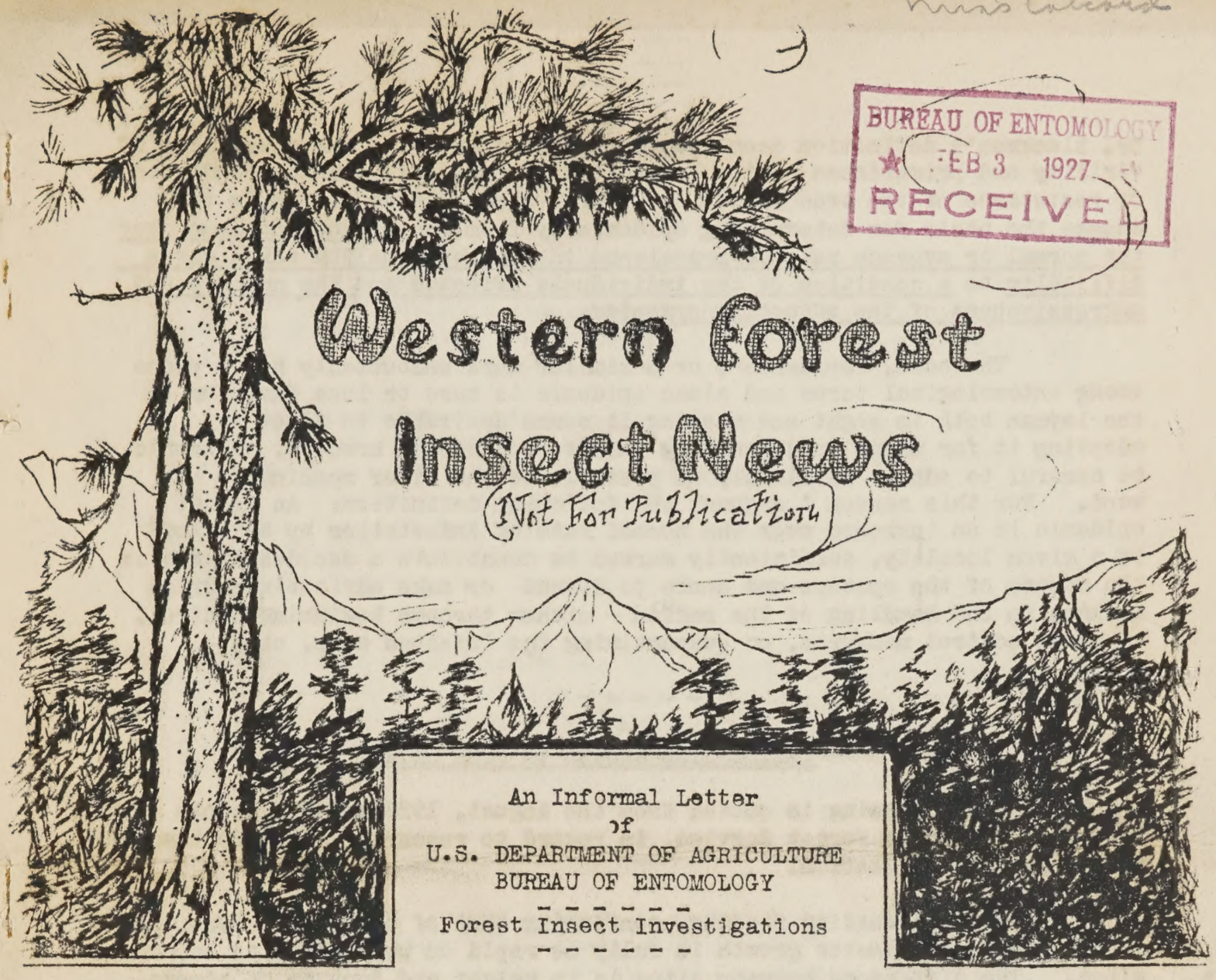

Western Forest Insect News

(Not For Publication)

An Informal Letter
of
U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY
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Forest Insect Investigations
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P.O. Box 3010, Stanford University, Calif. - February 1, 1927.

WHAT A BARKBEETLE EPIDEMIC IS.

By
Wm. Middleton.

I have just read "What is an Epidemic of Barkbeetles?" by Dr. M.W. Blackman. This is a very interesting article to me, and especially so since I don't quite agree with Dr. Blackman on the use of the word epidemic. My first objection is that if we are going to have epidemics of insects at all we should be careful to define epidemic in entomology so that the word will have but one meaning throughout the entire science. The usage of the word by Dr. Blackman for barkbeetles makes its interpretation special for these insects and different than its interpretation when used, say, for defoliators. My second objection is that the usage proposed seems to stray from the medical meaning of the word. Among medical men, the word epidemic seems to convey the idea of a condition of marked increase in the prevalence of a disease over the normal or average prevalence for that disease in a given locality.

Dr. Blackman's definition seems to touch sufficiently on the characters of virility and primariness of the barkbeetles (organisms) and the condition or resistance of the tree (host) to offer a special case and tends to change the basis for determining epidemicity from the marked increase over the normal or average rate of prevalence in a given locality for a given difficulty to a condition of the individuals affected and the numbers and aggressiveness of the affecting organism.

The word, "epidemic", or a similar word undoubtedly has a place among entomological terms and since epidemic is more or less familiar to the layman both in sight and meaning it seems desirable to adopt it. In adopting it for usage in describing insect conditions, however, we should be careful to adhere as closely as possible to the older meaning of the word. For this reason I suggest the following definition: An insect epidemic is an increase over the normal rate of infestation by an insect in a given locality, sufficiently marked to constitute a decided change in the menace of the species and hence to demand or make advisable radical changes in the handling of the region - either through beginning control, changing control measures, or quarantining the infested area, etc.

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YELLOW PINE GROWTH IN POOR SITES.

The following is quoted from the August, 1926 monthly report of the Branch of Research, Forest Service, in regard to research at the Southwestern Forest Experiment Station.

"An interesting finding, confirming that of other work here and abroad, is that diameter growth is fully as rapid on poor sites as on good sites. The difference between sites is in height and density of stands. Merchantable diameters are attained at the same age on the poorest sites as on the best ones, but the yields are very much lower on the poorer sites."

The above note has special reference to yellow pine (P. ponderosa) in Arizona and New Mexico. It is of particular interest in connection with the study of the rapidity of growth - insect susceptibility relationship.

- - - - - A.J.Jaenicke.

SPRUCE BUDWORM IN WYOMING.

The Forest Supervisor of the Shoshone National Forest, Wyoming, reports a serious epidemic of the spruce budworm in the Douglas fir stands of that region. It is reported that this infestation was first noticed in 1922. By 1926 the outbreak had reached such proportions that the timber stands of entire drainages were destroyed. Trees of high esthetic value in camp and recreational sites are threatened by this epidemic and if possible measures will be taken to protect these trees from destruction.

J.C. Evenden

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CONFERENCE ON THE WHITE PINE WEEVIL.

Last summer the Northeastern Forest Research Council suggested that since so many agencies are now interested in investigations on the white pine weevil it would be desirable to hold a conference to determine the points on which further information is needed and the best means of getting it.

Arrangements were made to hold the conference in connection with the meetings of the Association for the Advancement of Science and its allied societies. The date set was December 29, and the following were present: J.M. Swaine and R. Hopping, Dominion Entomological Branch, Ottawa, Canada; H.L. Bailey, Entomologist, Vermont Department of Agriculture; H.B. Peirson, State Entomologist, Maine; H.W. Hicock, Connecticut Agricultural Experiment Station; S.T. Dana and H.J. MacAloney, Northeastern Forest Experiment Station.

The consensus of opinion was that direct control measures, except on relatively small areas, were too expensive to be used. Doubt was expressed by all regarding the effectiveness of native parasites. Doctor Swaine suggested that any contemplated breeding and liberation of parasites should be carried out at some laboratory fitted for that purpose. It was suggested that these phases of the investigation be curtailed, only enough time being spent to assure the completing of the experiments now under way at or in the vicinity of the Harvard Forest.

It was decided to concentrate as much time as possible on the development of control measures through improved systems of forest management. Density of stocking in pure stands and the composition of mixed stands necessary for protection from the weevil attack were discussed and it was decided that further work should be done along these lines.

Cooperation was offered from Vermont, Connecticut, and Maine as previously. At Doctor Swaine's invitation it is expected that Mr. MacAloney will spend a month or six weeks next summer in collaboration with the Dominion Entomological Branch.

Harvey J.Macaloney.

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COOPERATIVE RESEARCH

The Forest Insect Field Station, Coeur d'Alene, Idaho, will assist the Northern Rocky Mountain Forest Experiment Station in a study of the relation which fire injured white pine trees bears towards the reseeding of the area. The Coeur d'Alene Station will assist in this problem by checking the trees within the permanent plots each year to determine the part which insects are playing in their destruction.

J.C. Evenden

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ATTRACTION OF TOPKILLED TREES.

It is known that yellow pine trees that are topkilled by Ips confusus are often attacked and completely killed later by D. breviconis.

This study was undertaken to determine whether or not such topkilled trees are definitely attractive to D.b. and also the percentage of topkilled trees that become D.b. trees. A record has been kept of every topkilled and D.b. killed tree on the Cascadel unit of the Sierra Forest for the past three years. By a study of these records it was possible to determine the number of topkilled trees that are completely killed later by D.b. The following table gives the total number and volume of topkilled trees for the three year period and the number and percent of these that are subsequently killed by D.b.

Topkilled Trees Subsequently Killed by D.b.

Year of topkilling	Total Topkilled		Killed by D.b. (1925 & 1926)		
	No. trees	Volume	No. trees	Volume	Percent of Total.
TH (1924) (Winter)	148	226,110	68	97,850	46
TI (1925)	12	19,900	2	3,470	17
TJ (1926)	16	18,610	6	5,810	37
Totals	176	264,620	76	107,130	Av. 43%

The selection by D.b. of 76 out of 176 topkilled trees indicates that the topkilled trees are definitely attractive to D.b.

For this same period, 1924-1926, 629 trees were killed by D.b. Of this number 95 or 15 per cent had been previously topkilled.

Studies made by Keen in 1916 - 17 on the Lambs Mine unit near Ashland, Ore., gave results similar to the above. Out of a total of 192 topkilled trees 51 or 26.6 percent were killed by D.b. within two years.

The average percent of the topkilled trees that were killed by D.b. for these two studies is 35 percent. Since less than one percent of the total number of trees in the stand are selected annually by D.b. it is evident that the topkilled trees are definitely attractive to D.b.

In most cases the trees are killed by D.b. within one year following the topkilling. As an example, 68 of the trees topkilled late in 1924 were killed within 2 years. Of this number 65 or 95 percent were killed within the first year.

This study, though too limited to warrant general conclusions, indicates that yellow pine trees topkilled by Ips confusus are quite attractive to D.b.

In the two situations studied 35 percent of the topkilled trees were killed by D.b. within two years. This is in contract to the number of trees in the total stand that are D.b. Killed, which is rarely over one percent annually.

H.L.Person

REAL EPIDEMIC ON COLORADO NATIONAL FOREST .

Person spent the period December 9-13 on the Estes Park district of the Colorado National Park investigating the reported epidemic of the Black Hills beetle in yellow pine.

All of the evidence found indicates that a real epidemic has obtained a good start. The 1926 infestation shows a 500 percent increase over that of 1925. There was an average of 40 trees to the section killed in 1925 and there is an average of 200 trees to the section infested in 1926.

Including the Boulden district where the infestation is reported considerably lighter there are about 40,000 infested trees in the area of 280 Sections.

Person believes that the present is the proper time to bring the epidemic under control and recommends that the 40,000 infested trees be treated during the spring of 1927 at an estimated cost of $20,000. Half of this is chargeable to the Forest Service and half to the private owners.

H.E. Burke.

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BARK BEETLES AND LIGHTENING IN NORTHERN ARIZONA.

The following item is taken from The Intermountain District Daily News of December 15, 1926 (Forest Service, Ogden, Utah).

The Kaibab National Forest reports that the greater portion of its fires originated by lightning striking dead trees, the past summer. Sixteen fires were started by lightning striking dead trees and 13 fires were started by lightning striking green trees. Supervisor Mann reports that on the Kaibab Forest, dead trees are a real menace. There are over 150 million feet of timber killed by bugs. These dead trees are in the main the larger ones and on points where lightning is most likely to strike. The Supervisor thinks that lightning does not strike a dead tree any more readily than it does a green one, but it starts more fires in the dead trees.

There were more fires on the Kaibab Forest in 1925 than in any previous year, and in 1926 there were twice as many fires as occured in 1925. Supervisor Mann raises the following question:

"I wonder if the fire hazard is increasing on the Kaibab. I wonder if that increase could be caused by the large number of dead trees standing as a result of the insect infestation of the last few years. We intend to continue our studies in this next year and watch it closely."

A.J.Jaenicke.

ANNUAL MEETING OF WESTERN FORESTRY AND CONSERVATION ASSOCIATION.

The forest insect problem was taken up at the meeting of this Association at Victoria, B.C., December 6 to 9, 1926. On the third day of the meeting, a short paper by the writer entitled "Can Forest Insect Losses Be Disregarded?" was followed by a very interesting discussion of the subject from the floor.

Mr. J.F. Kimball led the discussion and stressed the point that even through the present methods of control pay, there is a decided need for more research to develop better methods.

Mr. Jacobson brought out the fact that entomological considerations are very closely tied in with any cutting policy and that the leaving of slow growing beetle susceptible trees was not a good forest policy.

District Forester Rutledge urged that funds for fighting beetle epidemics should be placed on the same emergency basis as fire fighting funds, since in both cases prompt suppression work gave the best results.

District Forester Morrell spoke of the heavy losses which District 1 has recently sustained and the need for more investigative work and less expensive methods.

Mr. Harry Shellworth of the Boise Payette Lumber Company said that on one tract of his company's land which cruised 18,000,000 feet in 1904-5 showed a net loss of 3,000,000 feet from beetle infestation when cruised in 1919.

As a result of the meeting a permanent committee of the association to handle matters pertaining to forest insect control was appointed, consisting of representatives from each of the five western states. This committee includes the following:

Chairman	-	Captain J. B. Woods, forester for the Long-Bell Lumber Co.
Secretary	-	H.H. Chapler, Forester in charge of protection, Western Forestry and Conservation Association.
Oregon	-	J.F. Kimball, F.A. Elliott, Morris Shelton, and W.J. Chamberlin.
California	-	S.R. Black and M.B.Pratt.
Idaho	-	Harry Shellworth, W.D. Humiston, and Ben Bush.
Washington	-	C.S. Chapman and George C. Joy.
Montana	-	Roscoe Haines and Rutledge Parker.

The following resolution was endorsed by the Association:

"The seriousness of forest insect depredations impresses us forcibly with the necessity of immediate action. We urge our delegations in Congress to seek adequate funds to enable the Bureau of Entomology to conduct study of insect control problems in western forests and to provide control measures on public lands."

F.P.Keen

CONTROL WORK ON THE SOUTHERN OREGON-NORTHERN CALIFORNIA PINE BEETLE CONTROL PROJECT.

In April and May, 1926, the Klamath Forest Protective Association did control work west of Klamath Falls, Oregon, against D. brevicomis in a yellow pine stand of unusually fine quality. The infestation was an especially heavy one in territory which is part of Area One of the so-called "Southern Oregon - Northern California pine beetle control project." The cost figures are remarkably low. The following statistical figures will probably prove of interest to those engaged in brevicomis control problems:-

Area (private) covered by control work	19,000 acres
Yellow pine volume treated	6,126 M.bd.ft.
Number of trees treated per section	158
Volume treated per section	204 M.bd.ft.
Average volume per tree	1,280 bd.ft.
Cost of control per M. bd. ft.	$2.19
Total cost of control work	$13,415.47

Although the average section showed a treated volume of 204 M. board feet, on five sections over 300 M. board feet per section were treated.

Assuming that the average yellow pine stand in this fine timber is 30 M. board feet per acre (a mere guess), and assuming that the total 1926 beetle loss is equal to twice that which was treated, the 1925 beetle loss is equivalent to over two per cent of the stand.

The low cost of the control work is worthy of special attention.

A.J.Jaenicke.

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YELLOWSTONE INSECTS LIKE CALIFORNIA CLIMATE.

The needletyer (Eulia sp.) and the sawfly (Neodiprion sp.) which have caused severe damage to the lodgepole pine forests of the Yellowstone National Park during the last four or five years appear to thrive under the benign influence of the California climate. In the Yellowstone both species spend the period October 1 to May 1 under the top layer of old needles which forms the forest floor. Specimens of needletyer chrysalids collected at West Yellowstone, Mont., early in September and taken to the laboratory at Palo Alto, Calif., produced moths in December. Cocoons of the sawfly collected at the same time and taken to Palo Alto produced sawflies in January. In the case of both species this is at least six months before the time for normal emergence. Temperature appears to be the determining factor. - H.E. Burke.

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ENTOMOLOGY TO BE MADE A REQUIRED SUBJECT AT O.A.C.

One by-product of the Western Forestry and Conservation Association Meeting was the decision on the part of Dean Peavey to make forest entomology one of the required subjects in the curriculum for forestry students at the Oregon Agricultural College.

For the past several years, W.J. Chamberlin has given five courses in forest entomology at O.A.C. but up to the present time all of these have been optional on the part of forestry students.

F.P.Keen

PERSONNEL HAPPENINGS

F.P. Keen of the Palo Alto Laboratory, J.C. Evenden of the Coeur d' Alene Forest Insect Station, J.C. Chamberlin of the Oregon Agricultural College and Ralph Hopping of the Canadian Entomological Branch represented the forest entomologists at the annual meeting of the Western Forestry and Conservation Association which was held at Victoria, B.C. December 6-9.

H.L.Person spent the period December 6th to January 19th on a trip to St. Paul, Minn., and return. On the way a stop was made at Denver to investigate the Black Hills beetle infestation in the yellow pine on the Colorado National Forest and the Rocky Mountain National Park. At St. Paul a conference was held with Dr. S.A. Graham on the studies being made on the western pine beetle in Oregon and Washington.

J.C. Evenden attended the annual meeting of the District Investigative Committee of Forest Service District No. 1 which was held in Missoula, Montana, on January 13th, 14th, and 15th. A very interesting and helpful program was presented covering all phases of forest research. The problems of forest entomology, and investigations under way, were adequately discussed by those present with many helpful suggestions being made.

J.M. Miller attended the annual meeting of the District Investigative Committee of Forest Service District No. 5 which was held in San Francisco on January 24th and 25th. The research program of the Palo Alto Laboratory of Forest Insect Investigations and its relation to the California Forest Experiment Station were among the topics discussed.

George R. Struble, a senior student in Entomology at Stanford University, has been appointed a Field Assistant and assigned to the Palo Alto laboratory.

Albert Wagner is spending the winter at the Palo Alto laboratory working up data on the Northfork investigations and is assisting with some of the experimental work at the laboratory.

W.J. Buckhorn resigned January 1st and is now taking the course in aeroplane mechanics and aviation at the Sweeney Automotive School, Kansas City, Mo. "Buck" deserves success in his new venture and we are sure that he will obtain it.

Married January 21st, 1927, in San Francisco, Hubert L. Person and Carol S. Waller. The entire laboratory force extends to "Percy" and his bride their heartiest congratulations and very best wishes. May they live long and prosper, not too much, but enough to keep their future life as happy as it was on their wedding day.

THE SOLAR HEAT METHOD OF BARKBEETLE CONTROL; ITS HISTORY AND USE.

Forest Entomologists are always interested in new methods of barkbeetle control. In particular, the entomologist charged with the supervision of a control project is directly concerned with developments in these lines. For this reason, information concerning the application of new methods and the results obtained is always timely and of value.

In the following paragraphs the history of the so-called "solar heat" method of control, its application on the Crater Lake Project, and the results secured are discussed. This method, while not new to entomologists, has not, to the knowledge of the writer, before been extensively employed on control projects.

It appears from a perusal of old correspondence and reports that the "discovery" of the method has been made by four different men working separately and without knowledge of the findings of the others.

Ranger Roger S. Baldwin, who was in charge of control work on the Santa Barbara Forest, California, in 1905, in a letter to Dr. Hopkins under date of September 20, 1905, writes: "As I have already reported, the barkbeetles, especially the Tomicus (Ips) in the larval stage is very sensitive to heat. I find in the case of slash, cut after July 15th, and exposed to the direct rays of the sun, both larvae, and in a lesser degree, the adult beetles are shriveled up and killed by the heat". This appears to be the oldest record we have of the sun as a factor in control.

In 1917, the writer was impressed with the fact that the mountain pine beetle, Dendroctonus monticolae, refused to attack down lodgepole pine trees in the Yosemite Park, and that broods of this beetle in trees cut in July died as the result of exposure of the logs to direct sunlight.

Again in 1919, similiar observations were made by Albert Wagner in the Sequoia Park. In May, yellow pine trees infested with Dendroctonus brevicomis were cut. They were not burned at this time on account of the great fire hazard. When later examined, it was found that a high percentage of the brood had died, presumably as a result of heat generated under the bark by the sun's rays.

These last observations led to investigations into the possibility of utilizing direct sunlight as a control method. Subsequently, in the summer of 1920, detailed experiments were carried out at Northfork, California, by Miller and at Ashland, Oregon, by Patterson. The results of these experiments were not published but were summarized in the form of reports.

In the meantime similiar observations were made by Dr. F.C. Craighead in the east, and it was he who published the first account of the method as a control factor. In his article, "Direct Sunlight as a Factor in Forest Insect Control", published in The Proceedings of the Entomological Society of Washington, Vol. 22, No. 5, May, 1920, he states "It was accidently discovered by the writer that direct exposure to the sun can be utilized ****** as a highly efficient method of prevention or control of the more destructive tree-killing and wood-boring insects". His first observations were made in the summer of 1917 when the death of broods of Cyllene pictus in hicory logs was accounted for by the sun's heat. Later in 1918, he experimented with various species of Scolytid beetles in pine at Falls Church, Virginia, with similiar results.

So much for the history of the discoveries of the method. Entomologists are perhaps more interested in the manner of application and the results of its use. The technique of the application of the solar heat method on the Crater Lake Project where it has been successfully employed for two years treating lodgepole pine infested with Dendroctonus monticolae is described in the following paragraphs.

In the first control work on this project, early in 1925, the burning method of treating the infested trees was employed. It soon developed that this method was not at all suitable for the type of timber infested. The lodgepole pine in this park produces a dense stand and in using the burning method the scorching of the adjacent green trees by the control fires was far too severe. It was not practical, due to the excessive cost, to haul the logs to openings to burn them. Therefore it was necessary to employ an entirely different method of treatment. Tests were made to determine if the sun's rays would produce sufficient heat at the high altitudes of the control areas to allow the use of the solar heat method. Results were favorable, as temperatures which resulted in total mortality of the broods were attained, (120 degrees F.).

The technique of the method, as used on this project, is as follows: The infested trees are felled so that their trunks will extend in a north and south direction. Placing the logs in this position is necessary in order to expose the top and both sides to direct sunlight during the course of the day. After the logs have been felled it is necessary to remove the limbs along the infested length and cut off the uninfested tops in order to fully expose the logs. After they have been prepared in the above way the logs are left to the exposure

of the sun's rays for from 2 to 4 days. They are then turned half over and the under side exposed. In the case of the larger trees (above 20 inches diameter D.B.H.) it is sometimes necessary to turn the logs twice, (one-third over each time), with intervals of at least 2 days between turnings, in order to fully expose all the bark surface. A temperature of 110 degrees F will kill the mountain pine beetle in any stage of its development. The temperatures attained in the cambium layer of logs treated in the above way on this project ranged from 110 deg. to 120 deg. with a minimum exposure of 1 hour to direct sunlight during any part of the period from 10AM to 3PM.

It was found that the solar heat method is equally as effective and practical as any other known method of treatment of lodgepole pine infested with this beetle. It has the following advantages over the burning method: There is no fire scorching of adjacent green trees and no unsightly, partially fire consumed logs, are left. It is not necessary to haul the logs into openings to burn them, or to prepare fire lines, or to exercise other precautions against fire escaping into the standing forest. It does not create conditions attractive to the beetles, while the attractive influence of fire scorched trees is very great. And finally the method does not destroy certain natural insect enemies of the beetles, such as the predacious Clerids, and the Hymenopterous and Dipterous parasites. It does not kill Ips which are secondary insects in attacks in these forests. These beetles develop and furnish food for the predators and parasites.

On this particular project the cost of treating trees by the solar heat method was practically the same as by burning under ordinary conditions. However, when it was necessary in the use of the burning method to haul the logs to openings or deck them for burning, and to take precautions against control fires escaping to the surrounding forest, the solar heat method is much cheaper.

J.E. Patterson.

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ANOTHER VIEWPOINT ON FIRES AND INSECTS.

We have so generally accepted the necessity for fire protection in our western timber stands that H.H.Chapman's discussion in the January issue of the Journal of Forestry concerning "The Use of Fire in Regeneration of Certain Types of Forests in India" reads like the bolshevistic arguments of a light burner. The point is brought out that in long leaf pine of the Southern United States, periodical burning not only seems necessary to secure reproduction but is a benefit also in keeping down the defoliating fungus, Septoria pini.

Perhaps here in our western forest types complete protection in areas where periodic fires have been a factor in the past has so changed environmental conditions that we can expect new angles of our forest insect problems. Has burning of the ground cover been a controlling factor

of the Pandora moth in the eastern Oregon stands to the extent that recent outbreaks are a result of fire protection? Has cone beetle damage in sugar pine increased as a result of keeping ground fires out of this type? Does the overstocking of mature yellow pine stands with reproduction produce conditions favorable to barkbeetle epidemics which can be relieved by fires' that will thin reproduction without injuring the mature trees?

However, in the face of our present knowledge it would seem that any benefits that may be claimed for fire would be entirely outweighed by the obvious disadvantages.

J.M.Miller.

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